Check this website frequently. Any changes to the course syllabus, course announcements or other important information will be communicated here.

You are expected to be fully aware of the following policies and expectations, so review this information carefully and ask your instructor if you have questions.

1. **Prerequisites:** It is assumed that students entering MATH 121 will typically have completed four years of college preparatory mathematics including Algebra I and II, Geometry and Trigonometry. Any questions concerning your readiness for the course should be resolved immediately.

2. **Course Coordinators:**
   - Andrew Hicks  ahicks@math.drexel.edu  Korman 206
   - Ron Perline  Ronald.k.perline@drexel.edu  215-895-6623  Korman 272
   - Judy Smith  jts47@drexel.edu  Korman 252
   A list of other instructors with their office hours and contact information is available on the course website. All instructor’s mailboxes are in Korman 206.


4. **Course Format:** Depending on your scheduling, your calculus class will meet either two or four times a week. During class your instructor will be presenting lectures on the course material and engaging the class in discussion and problem sessions. There will be a short quiz each week.

5. **Attendance:** Regular attendance is essential for success in Math 121. You are responsible for everything that goes on in class. The quarter moves quickly – if you don’t do your work regularly, it is easy to fall behind.

6. **Assigned Problems:** The assigned problems listed on the course syllabus have been chosen to illustrate the concepts and techniques that you are expected to master. It is your responsibility to do all the work on the assigned problems. By doing the problems yourself you will acquire the skills needed to perform well in the course. **Re-reading the textbook and reviewing your class notes are good ways to determine the solution to a homework question that may be giving you some issues.**

7. **Extra Help:** In addition to your instructor’s office hours, you can receive extra assistance in the Math Resource Center (Korman 247). The Resource Center is open Monday through Thursday 10:00 a.m. to 7 p.m. and Friday 10:00 a.m. to 4:00 p.m. Students who visit the MRC regularly often raise their grades by at least one letter grade.
8. **Quizzes:** Each week there will be an in-class quiz which will cover material discussed up to that point in the class. Each quiz will be worth 10 points so there will be 110 possible quiz points for the term. Your final in-class quiz grade will be the total number of points obtained divided by 100 — any final quiz grade over 100 will be considered extra credit. **There are no-make-up quizzes. You must be present in your scheduled class to take the quiz.**

9. **Exams:** There will be 3 exams during the quarter: October 5, October 19, and November 2. These exams will be common exams (all students taking Math 121 take the exam at the same time) given during the 8:00-8:50 a.m. exam period. There will be a single make-up exam for anyone who misses one of the three regularly scheduled exams. It will be given during week 9 and will be comprehensive for the material covered on exams 1, 2, 3.

10. **You must bring your University ID card to all three exams and the final exam.** **YOU MUST KNOW YOUR SECTION NUMBER FOR ALL EXAMS.** Five points will be deducted from your exam grade if you do not write down your correct section number on your exam. All exams are closed book and closed notes. No calculators or other electronic devices are permitted for any of the exams or quizzes.

11. **Final Exam:** There will be a two-hour comprehensive final exam scheduled during the final exam week at the end of the quarter.

12. **Course Grades:** At the end of the quarter you will have six grades. (Final exam counts twice)

<table>
<thead>
<tr>
<th>Exam</th>
<th>Percentage</th>
<th>Quiz Average</th>
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<tbody>
<tr>
<td>Exam 1</td>
<td>20%</td>
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<tr>
<td>Exam 2</td>
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<tr>
<td>Exam 3</td>
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Of the five grades (not the quiz average), the lowest will be dropped and a letter grade assigned as follows:

- 90-100 A
- 80-89 B
- 70-79 C
- 60-69 D

Plus and minus will be assigned at the discretion of the instructor.

Note: The instructional staff of Math 121 reserves the right to modify the grading criteria as needed in individual cases.

13. **Disabilities and Accommodations:** Students with disabilities may request accommodations (e.g. extended time on exams). Students must provide the instructor with an Accommodation Verification Letter before any accommodations are granted. Details and procedures can be found at [http://www.drexel.edu/ods/](http://www.drexel.edu/ods/)

14. **Academic Honesty:** Cheating and other forms of academic misconduct are serious offenses and are dealt with harshly, e.g. at the very least a 0 on an exam and a letter sent to the Office of Student Conduct. The Academic Honesty policy of Drexel University is
Outcomes List for Math 121 Calculus I
Fall 2011-2012

General Information:
The purpose of this Outcomes List is to give you a concrete summary of the material you should know, and the skills you should acquire, by the end of this course. If you understand all of the concepts summarized on this Outcomes List, review all of the assigned problems listed on the syllabus, and review all of the additional problems listed below, then you should be adequately prepared for the exams. Understand though that the problems below are representative; there is no guarantee that the problems on the exam will look exactly like these.

The following information is for reviewing the material for Exam 1:
Exam 1 will cover Chapters 0.1, 0.2 0.4, 0.5, Appendix B, 1.1 and 1.2

0.1 Know the definition of a function. Determine if a curve in the xy-plane represents the graph of a function y = f(x). Evaluate functions at specific values. Determine the domain and range of a function. Understand how algebraic operations affect the domain of functions. Write formulas for functions in the context of a word problem.

In addition to reviewing the assigned problems from 0.1, look at: Examples (within the chapter): 7, 8; Regular problems (exercises at the end of the chapter): 9, 32

0.2 Given two functions f and g, define (and find the domains) of the arithmetic combinations f+g, f-g, fg, f/g and the composition \( f \circ g \).

In addition to reviewing the assigned problems from 0.2, look at Regular problems 30, 32

0.4 Given a function, determine if it has an inverse, and if so, determine what the inverse is. Relate the domain and range of a function with the domain and range of its inverse. Relate the graph of a function to the graph of its inverse. Understand inverse trigonometric functions (specifically arcsin, arccos, and arctan), and in particular the angle restrictions for each.

In addition to reviewing the assigned problems from 0.4, look at: Example 6; Quick Check exercise 4, 5; Regular problems 19, 38
0.5 Know the definitions of exponential and logarithmic functions. Know the algebraic properties of exponents and logarithms. Solve exponential and logarithmic equations.

In addition to reviewing the assigned problems from 0.5, look at: Example 4; Regular problems 12, 17, 27

Appendix B: Know the basic trigonometric identities found under “Course Materials” on the course website. Be able to evaluate all trigonometric functions at the “special angles” \( \frac{\pi}{6}, \frac{\pi}{4}, \frac{\pi}{3}, \frac{\pi}{2}, 0, \pi, \frac{3\pi}{2} \) as well as related angles in the different quadrants. Know the graphs of the sine, cosine, and tangent functions. Be able to solve a trigonometric equation.

In addition to reviewing the assigned problems from Appendix B, look at: Regular problem 14

1.1 Given the graph of a function \( y = f(x) \), determine the limit of \( f(x) \) as \( x \) approaches some finite value (as both a one-sided and two-sided limit). Determine when such a limit does not exist, and if appropriate, indicate if the behavior of the function increases or decreases without bound.

In addition to reviewing the assigned problems from 1.1, look at: Quick Check exercise 4; Regular problem 8

1.2 Know the basic properties of limits, i.e. how limits interact with sums, products and other operations (Theorem 1.2.2). Given the formula of a function \( y = f(x) \), determine the limit of \( f(x) \) as \( x \) approaches some finite value (as both a one-sided and two-sided limit). Determine when such a limit does not exist, and if appropriate, indicate if the behavior of the function increases or decreases without bound. Use algebraic techniques such as factoring and rationalizing to help with indeterminate forms.

In addition to reviewing the assigned problems from 1.2, look at: Examples 9, 10; Regular problems 38, 40
The following information is for reviewing the material for Exam 2:

Exam 2 will cover Chapters 1.3, 1.5, 1.6, 2.1, and 2.2

1.3 Determine limits at infinity, in particular for polynomials, rational functions, functions involving radicals, exponential functions, and logarithmic functions. Use algebraic techniques to help with indeterminate forms $\frac{\infty}{\infty}$ and $\infty - \infty$. Use substitutions to help with limits of compositions of functions.

In addition to reviewing the assigned problems from 1.3, look at: Examples 10, 11; Regular problem 60

1.5 Know what it means for a function to be continuous at a specific value and on an interval. Find values where a function is not continuous. Determine if a piecewise function is continuous. Use the Intermediate Value Theorem to show the existence of a solution to an equation.

In addition to reviewing the assigned problems from 1.5, look at: Quick Check exercises 4, 5; Regular problems 30, 34, 45

1.6 Know where the trigonometric and inverse trigonometric functions are continuous. Use the limits in Theorem 1.6.5 to help find the limits of functions involving trigonometric expressions.

In addition to reviewing the assigned problems from 1.6, look at: Example 4; Regular problems 22, 38

2.1 Compute the average rate of change of a function over an interval, i.e. find the slope of a secant line through two points in the graph of a function. Use a limit to compute the instantaneous rate of change of a function (for arbitrary and specific values), i.e. find the slope of a tangent line to a function.

In addition to reviewing the assigned problems from 2.1, look at: Examples 4, 5, 6; Regular problem 26

2.2 Compute the derivative of a function using the definition of a derivative. Understand the geometric interpretation of a derivative (slope of a tangent line), and use the derivative to help find the equation of a tangent line. Understand the physics interpretation of a derivative (instantaneous velocity). Understand how the graph of a function affects the derivative; given the graph of a function sketch the graph of the derivative function.

In addition to reviewing the assigned problems from 1.3, look at: Example 2; Quick Check exercise 3; Regular problems 25, 31
The following information is for reviewing the material for Exam 3:

Exam 3 will cover Chapters 2.3, 2.4, 2.5, 2.6, 3.1, and 3.2

2.3 Know that the derivative of a constant function is 0. Compute the derivatives of sums and differences of functions, and of constant multiples of functions. Compute the derivatives of power functions by using the Power Rule. Compute higher-order derivatives.

In addition to reviewing the assigned problems from 2.3, look at: Example 8; Quick Check exercise 1; Regular problem 53

2.4 Compute the derivatives of products and quotients of functions with the Product and Quotient Rules.

In addition to reviewing the assigned problems from 2.4, look at: Quick Check exercises 1, 2; Regular problem 33

2.5 Know the derivatives of all six trigonometric functions. Use these derivatives in the context of word problems.

In addition to reviewing the assigned problems from 2.5, look at: Examples 3, 4

2.6 Use the Chain Rule to compute the derivatives of compositions of functions.

In addition to reviewing the assigned problems from 2.6, look at: Examples 3, 4; Regular problems 5, 67

3.1 Compute \( \frac{dy}{dx} \) and \( \frac{d^2y}{dx^2} \) using implicit differentiation, i.e. without explicitly solving for \( y \).

In addition to reviewing the assigned problems from 3.1, look at: Examples 3, 4; Regular problem 33

3.2 Compute the derivatives of logarithmic functions. Use logarithmic differentiation to help with the computation of functions involving products and quotients.

In addition to reviewing the assigned problems from 3.2, look at: Example 5; Quick Check exercises 1, 2
The following information is for reviewing the material since Exam 3:

The Final Exam is comprehensive. In addition to the material from Exams 1, 2, and 3, the Final Exam will cover Chapters 3.3, 3.4, 3.5, 3.6, 4.1, 4.2, 4.3, 4.4, and 4.5. At least 50% of the final exam will be based on the material we have covered since Exam 3.

3.3 Compute the derivatives of exponential functions. Compute the derivatives of the inverse trigonometric functions \( \sin^{-1}, \cos^{-1}, \tan^{-1}, \sec^{-1} \). Use logarithmic differentiation to compute the derivatives of functions of the form \( (f(x))^g(x) \) (where \( f \) and \( g \) are nonconstant functions of \( x \)).

In addition to reviewing the assigned problems from 3.3, look at: Example 4; Quick Check exercise 3; Regular problem 48

3.4 Solve related rates problems. (It would be helpful to remember the strategy outlined in the blue box on page 205.)

In addition to reviewing the assigned problems from 3.4, look at: Examples 4,5; Regular problems 11, 18

3.5 Compute the local linear approximation of a function at a specific value. Use the local linear approximation to estimate given quantities. Use differentials to estimate errors in given quantities.

In addition to reviewing the assigned problems from 3.5, look at: Example 2; Regular problems 26, 58

3.6 Use L’Hopital’s Rule to help solve limits involving indeterminate forms \( \frac{0}{0} \) and \( \frac{\pm \infty}{\pm \infty} \). Solve limits involving indeterminate forms \( \infty - \infty, 0 \cdot \infty, 0^0, \infty^0, 1^\infty \) by manipulating the limits into a form where L’Hopital’s Rule is applicable.

In addition to reviewing the assigned problems from 3.6, look at: Example 6; Regular problems 24, 36

4.1 Understand how the signs of the first and second derivatives of a function are related to the behavior of the function. Use the first and second derivatives of a function to find intervals on which the function is increasing, decreasing, concave up, and concave down. Find the locations of inflection points.
In addition to reviewing the assigned problems from 4.1, look at: Example 5; Quick Check exercise 3; Regular problem 30

4.2 Find the critical points of a function, and apply the First Derivative Test and Second Derivative Test (when appropriate) to determine if the critical points are relative maxima, relative minima, or neither. Use the extrema along with the end behavior (i.e. “dominant term”) of polynomials to sketch the graph of polynomial functions.

In addition to reviewing the assigned problems from 4.2, look at: Example 8; Regular problem 36

4.3 Determine if a graph of a function has a cusp or vertical tangent line at a point (i.e. the function is not differentiable at that point). Use this information, along with extrema, intercepts, and asymptotes, to sketch the graph of a function.

In addition to reviewing the assigned problems from 4.3, look at: Examples 2, 3, 4

4.4 Find the absolute maxima and minima of a function, and where they occur, over a given interval.

In addition to reviewing the assigned problems from 4.4, look at: Example 2; Regular problem 14

4.5 Use the techniques from 4.4 to solve optimization problems, i.e. given a system of related quantities, find values of the quantities that optimize one of them (e.g. minimize a cost, maximize a volume, etc)

In addition to reviewing the assigned problems from 4.5, look at: Examples 4, 5; Regular problems 14, 50
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<thead>
<tr>
<th>Week</th>
<th>Lecture Topics</th>
<th>Sections</th>
<th>Assigned Problems</th>
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<td>1</td>
<td>Functions, New Funct From Old Trigonometry Review Inverse Functions</td>
<td>0.1 0.2 Apdx B 0.4</td>
<td>p. 12 1,3,7,9,23,25,29(a,b),31(a,b),35 p.24 27,29,31,33,35,37,51,53 pA23 7,9,11,13,15,21-29 odd, 37,43,45,49,53,55,61 p.48 7,9,11,15,25,35,37,39,53</td>
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<tr>
<td>2</td>
<td>Exp. &amp; Log Funct Limits (Intuitive) Computing Limits</td>
<td>0.5 1.1 1.2</td>
<td>p.61 1,5,9,15-29 odd p.77 1-9 odd, 21,23 p.87 1-31 odd, 37,39</td>
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<td>3</td>
<td>Exam 1 Oct 5, 2011 Limits at Infinity Continuity Limit &amp; Cont of Trig Functions</td>
<td>1.3 1.5 1.6</td>
<td>p.96 1,3, 9-37 odd,47,55,57,59 p.118 1,3, 7-21 odd, 29,31,33,47 p. 125 1-9 odd,17-37 odd, 53</td>
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<td>4</td>
<td>Tang Lines &amp; Rate of change Oct 10 No class Derivative Funct</td>
<td>2.1 2.2</td>
<td>p.140 1-17 odd, 23, 27 p.152 1-25 odd, 33</td>
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<td>6</td>
<td>The Chain Rule Implicit Diff. Derivative of log Funct</td>
<td>2.6 3.1 3.2</td>
<td>p.178 5-39 odd, 43-57 odd p.190 1-17 odd, 25,27,35 p. 195 1-29 odd, 35-43 odd</td>
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<td>7</td>
<td>Exam 3 Nov 2, 2011 Derivatives of Exp and Inverse Trig Funct Related Rates Local Linear Approx &amp; Differentials</td>
<td>3.3 3.4 3.5</td>
<td>p.201 15-47 odd,59,67A p.208 1-9 odd, 13-21 odd, 25.27.29.33 p.217 1-11 odd, 21-31 odd, 43,45,55,57,59,63</td>
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<tr>
<td>9</td>
<td>Make-up Exam Nov 16 Graphing Rational Funct Cusp, Vert. Tang, Absolute Extrema</td>
<td>4.3 4.4</td>
<td>p.264 1,3,5,25,33,35,45,47,51 p.272 1,3,7-13 odd, 21-43 odd</td>
</tr>
<tr>
<td>10</td>
<td>Applied Max-Min Thg No class Nov 23, 24,25</td>
<td>4.5</td>
<td>p.283 1-13 odd,21,23,31,51</td>
</tr>
<tr>
<td>11</td>
<td>Catch up and Review for the Final Exam</td>
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